

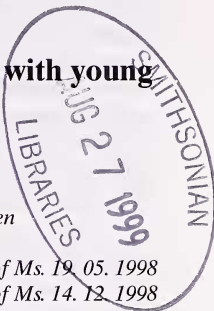


## Time of activity of a female free-ranging Lynx (*Lynx lynx*) with young kittens in Slovenia

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### Abstract

We investigated the activity behaviour and time-budget of a female free-ranging lynx (*Lynx lynx*) in Slovenia during the first five months of post-partum from June–October 1995. Activity was monitored by means of a radio-collar with activity sensor, employing continuous automatic recording and discontinuous time-sampling. A total of 1818 data hours was analysed with respect to the prey status, distinguishing between days with and without kill, and age of the kittens. On average the female was active for 8.5 h per 24-h day. Activity at twilight and during daytime was generally higher than during night. On days when the female hunted she was more active and more diurnal than on days when she had access to a kill. During the later post-partum mobile phase the female covered a considerably larger home range, was much more active, and showed higher twilight and daytime activity than during the earlier stationary phase. Movements to and from a kill occurred irregularly throughout the night during the stationary phase, while the whole family went to a kill around sunset and returned back around sunrise during the mobile phase. When a kill was available, the female spent on average 81 % of the 24-h day with her kittens, but only 63 % on days with no kill. Times of absence from the den did not increase during the stationary phase as the kittens grew older. Activity timing is interpreted as a highly differential temporal adaptation to meet various contrasting challenges, i.e., hunting, defence of kills against competitors, protection of young, and home range patrolling. Comparison with data from Switzerland suggest that habitat structure in addition is likely to shape lynx activity in different areas.

**Key words:** Eurasian lynx, activity, radiotelemetry, time budget, breeding

### Introduction

Recently, the Eurasian lynx (*Lynx lynx*) appears to be regaining parts of its former areas of distribution (see BREITENMOSER-WÜRSTEN et al. 1998) due to re-introduction and legal protection. In this connection it is particularly interesting to know to which extent the species is able to adapt its behaviour to different ecological conditions. Two important aspects in this regard are hunting activity and time budgets, since flexible responses to the environment are to be expected with these behavioural traits in particular. However, data on lynx activity behaviour are rather fragmentary. In general, the species is assumed to be primarily nocturnal and crepuscular (MATJUSCHKIN 1978; HEMMER 1993), although diurnal activity is also known to occur (HALLER and BREITENMOSER 1986).

Even less information is available on the relation between activity and breeding. The female lynx restricts its movements to a small part of its home range during the early rearing period, as also known from other Felidae (SEIDENSTICKER 1977; SUNQUIST 1981; SCHMIDT et al. 1997). Restricted space use is likely to be reflected in the activity pattern because the daily time schedule is closely linked to spatial behaviour. However, a feasible ad-hoc assumption about the total activity level is not possible since a breeding female has to balance the requirements of food intake with the specific challenges of rearing kittens. Increased hunting effort due to limited use of space during the early stationary phase may cause higher activity, while the extended use of space during the later mobile phase may also account for this as well.

In general, predators are known to time their activity in accordance to the activity pattern of their prey (e.g. ABLES 1969; SUNQUIST 1981; FERGUSON et al. 1988; BELTRAN and DELIBES 1994). However, when a lynx manages to kill a large prey like a roe deer, which is the main prey of the European lynx (PULLIAINEN 1981; SOSTAK and BUNEVIC 1986; BREITENMOSER and HALLER 1987; JEDRZEJEWSKI et al. 1993; PULLIAINEN et al. 1995), it may feed on it for up to one week (REINHARDT, pers. obs.). Having a kill or not can be supposed to affect the activity behaviour directly, with the assumption that the level of activity will be lower when the animal has a kill to feed on. Furthermore, also the temporal pattern of activity over the 24-h day may vary between days with and without kill, because time can be allocated to different types of activity depending on the short-term food supply. Almost nothing is known about this aspect of lynx behaviour.

In this study we present data on the activity and time budget of an intensively studied free-ranging female lynx in Slovenia during the first five post-partum months. In particular, we focus on the effect of prey status on temporal behaviour during two distinctive rearing periods.

## Material and methods

### Study area

The study was conducted in the Kocevka region in Southern Slovenia (45°35'N, 45°20'E). The 620 km<sup>2</sup> study area is part of the Dinara Mountain Range. Elevations range from 300 to 1300 m. The fine-scale relief is typical of high karst regions with numerous dolines, caves, boulder fields, and rock faces. Forest covers up to 90 % of the terrain with *Abieti-Fagetum-dinaricum* as the dominant forest community. The climate is temperate continental with annual precipitation from 1400 to 1800 mm. The average mean temperatures in January and July are -2.9 and 17.8°C, respectively.

Potential larger prey species of lynx are red deer (*Cervus elaphus*; annual harvest quote of 2-3 animals/100 ha), roe deer (*Capreolus capreolus*; annual harvest 0.7/100 ha), and a few chamois (*Rupicapra rupicapra*). Species that may compete or otherwise interact with lynx include brown bear (*Ursus arctos*), wolf (*Canis lupus*), red fox (*Vulpes vulpes*), golden jackal (*Canis aureus*), wild cat (*Felis silvestris*), badger (*Meles meles*), wild boar (*Sus scrofa*; annual harvest 0.8/100 ha), and a variety of raptor species.

### Activity reading

The lynx female was caught in a box-trap in April 1994. It was tranquillised with Zoletil 100 (Virbac, France, a mixture of Tiletamin and Zolazepam), ear-tagged, and fitted with a radio-collar equipped with a tip switch as activity sensor (Wagener, Germany). The tip switch caused the pulsing rate of the transmitted signal to alter between slow and fast, depending on collar position. In addition, signal strength varied due to changes in transmitter orientation relative to the lynx body, and relative to the receiver antenna. Since we were mainly interested in locomotor activity, lynx activity was indicated by changes in both signal strength and/or pulsing rate.

Activity was recorded in two different ways: Continuous recording was performed by means of an automatic recording station (B + R Ingenieurgesellschaft, Germany), which allowed determination of lynx activity for each single minute. In addition, discontinuous activity recording (time-sampling) was used when the lynx was outrunning the receiving area of the recording station. It was then followed by car, and radio signals were monitored every 5th minute for 60 sec with a hand-held Yagi-antenna and a portable receiver. A sample was classified "active" when three or more signal changes occurred during one minute, while inactivity was indicated by a steady signal pulse. In this way we followed the "predominant activity sampling procedure" which is considered most accurate for temporal activity assessment (TYLOR 1979). Compatibility of the two methods of activity reading was tested by simultaneous automatic recording and time-sampling for 20 h, which revealed a high agreement of 96.7%. To make both methods directly comparable in data analysis the tapes from continuous recording were time-sampled to simulate discontinuous activity recording.

The lynx gave birth to two kittens on the 1 June 1995 and was then followed during the first five months of rearing, i. e., from June until October 1995. During the first weeks after birth lynx kittens remain stationary at the den-site to which the female always returned from hunting (called "stationary phase" hereafter). During this time the recording station was kept near to the den-site, fitted with a directional antenna oriented towards the den. This allowed to record female activity near the den as well as times and length of den attendance. When lynx kittens have grown up to an age of seven to eight weeks, mother and young left the natal area and the kittens started accompany their mother (called "mobile phase" hereafter).

### Data analysis

Lynx activity was analysed with respect to the overall level of activity, the activity distribution over the 24-h day, and the relative activity allocation to different light phases. Twilight was defined as 1 h before and after sunrise and sunset, respectively. The basic time unit was hours of the clock. The proportion of samples scored active during each hour yielded the percent activity per hour, with the restriction that only hours with at least six activity samples were regarded in the analysis. The activity level was measured as the average activity per hour, per day, or per light phase.

Relative diurnality and crepuscularity indices were employed to compare the activity allocation to light phases between periods with different levels of activity and with different day length. The diurnality index  $I_D$  (modified after HALLE 1995) reflects the proportion of diurnal as compared to nocturnal activity and was calculated by

$$I_D = \left[ \frac{(\Sigma AD)/hD}{(\Sigma AD)/hD + (\Sigma AN)/hN} \right] \cdot 2 - 1$$

in which  $\Sigma AD$  and  $\Sigma AN$  are the times of activity summarised for day and night, respectively, and  $hD$  and  $hN$  are day length and night length, respectively.  $I_D$  is positive if diurnal activity prevails (maximum: +1 when exclusively diurnal) and negative when nocturnal activity prevails (minimum: -1 when exclusively nocturnal). The crepuscularity index  $I_C$  (modified after HALLE 1995) reflected the relative proportion of twilight activity as compared to the average activity over the 24-h day and was valued by

$$I_C = \log \left( \frac{(\Sigma AC)/\Sigma A}{4/24} \right)$$

where  $\Sigma AC$  is the time of activity during the hours of twilight ( $SR \pm 1$  h and  $SS \pm 1$  h) and  $\Sigma A$  is the total time of activity during an entire day.  $I_C$  is positive when activity during twilight is increased compared to the average activity, and negative when it is decreased.

Lynx activity behaviour was analysed for the total study period, the two rearing periods, and in relation to the prey status. For the latter all days of the field season (separated by midnight) were categorised according to prey status by locating the female several times a day using the methods of triangulation (or "homing in", WHITE and GARROT 1990). Locations where the lynx remained for an evening or night were searched for carcasses of prey killed by lynx the following day with a trained dog. Days were classified as "day with kill" if the kill was actually found, or if the lynx returned to the same place for several nights. If there was no indication of a kill, i. e., when the lynx changed its position considerably in successive nights, the status "day without kill" was given. When data were ambiguous, days were classified as "status unknown". Note that this classification, however, only ap-



plies to large ungulate prey and not to voles and other small prey items, which may be food resources as well (e.g. PULLIAINEN 1981; JEDRZEJSKI et al. 1993; PULLIAINEN et al. 1995).

Differences in activity distribution over the 24-h day were tested with the Kolmogorov-Smirnov-test. When testing for differences depending on prey status, data from days with unknown status were excluded. Wilcoxon-signed-rank-tests for related samples were used for comparisons between days with and without kill, and between the two rearing periods. In the same way we tested whether the female was more often absent from the den during the second half of the stationary phase than during the first. We used Kruskal-Wallis one-way analysis of variance for independent samples, adjusted by a Bonferroni procedure (c.f. TOUTENBOURG 1994), to test for differences among the average activity level at daytime, night-time, and twilight. All P-values are for two-tailed test.

## Results

### General activity pattern and prey status

The total base of activity data consisted of 1 818 data hours of which 1 275 h (70 %) were covered by automatic recording and 543 h (30 %) by time-sampling. Each hour of the clock (1:00–24:00) was represented by 59 to 95 data hours with an average of 11.1 activity samples per hour. For 1 490 h from 103 days the prey status was known, of which 824 h from 49 days were classified as “days with kill” and 666 h from 54 days as “days without kill”.

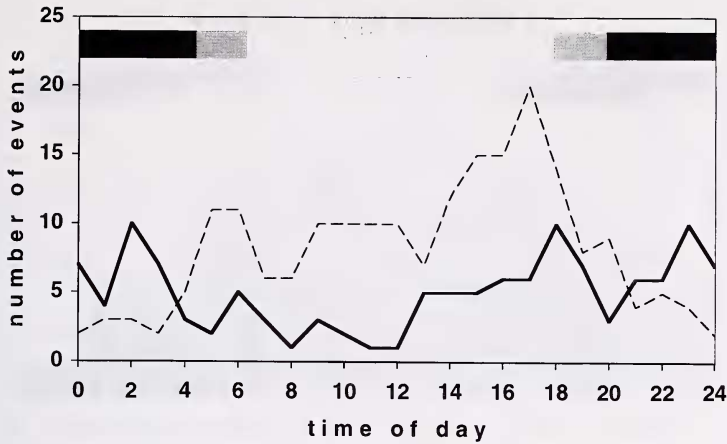
On average, the lynx was active for 35.5 % ( $N = 1\,818$ ,  $SD = 32.18$ ,  $SE = 0.75$ ) or 8.5 h of the 24-h day. Averaged over the entire study period the daily activity pattern revealed no significant deviation from an even distribution over the 24-h day ( $N = 1\,818$ , Kolmogorov-Smirnov,  $z = 12.29$ ,  $P < 0.001$ ). However, after splitting days into three distinct light phases, the overall level of activity differed significantly among them ( $N = 1\,818$ , Kruskal-Wallis,  $df = 2$ ,  $P = 0.001$ ), being highest during twilight, intermediate during daytime, and lowest during the night.

The lynx was more active on “days without kill” (45.7 %) than on “days with kill” (28.3 %;  $N = 24$ , Wilcoxon,  $P < 0.001$ ). Twilight and diurnal activity always prevailed but particularly so on “days without kill” ( $I_C = +0.12$ ,  $I_D = +0.15$  as compared to  $I_C = +0.03$ ,  $I_D = +0.06$  on “days with kill”). This indicates predominant hunting during broad day light.

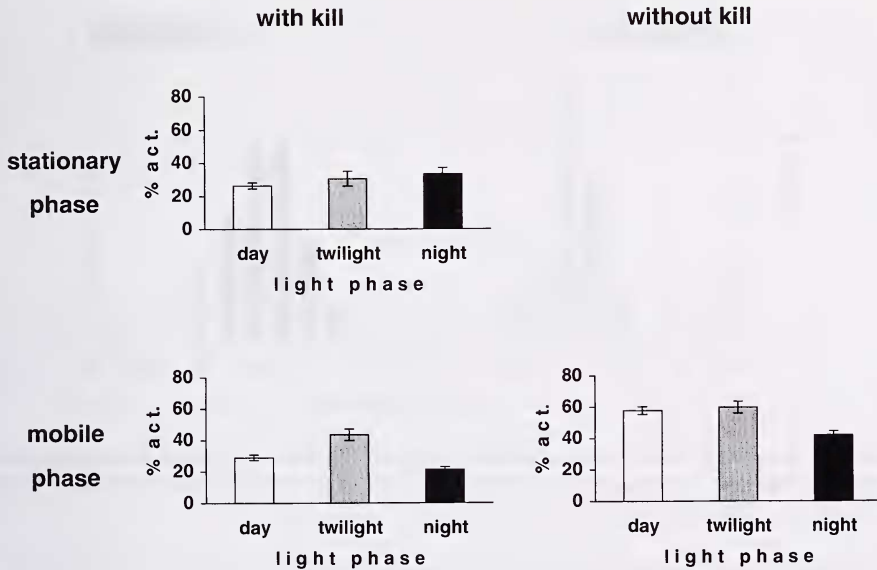
### Rearing periods

During the stationary phase the lynx used only 8 km<sup>2</sup> of her home range as compared to 110 km<sup>2</sup> during the later mobile phase. Correspondingly, the female was significantly more active during the mobile phase (39 %) than during the stationary phase (29.7 %;  $N = 24$ , Wilcoxon,  $P = 0.004$ ). This activity increase was above all caused by much higher day and twilight activity, whereas nocturnal activity decreased during the mobile phase, resulting in a substantial change in the daily activity pattern (Fig. 1). Activity distribution over the three light phases was fairly even during the stationary phase ( $N = 683$ , Kruskal-Wallis,  $P = 0.241$ ), while the difference twilight > day > night was highly significant during the mobile phase ( $N = 1\,135$ , Kruskal-Wallis,  $P < 0.001$ ; twilight vs. daytime:  $N = 706$ ,  $P < 0.001$ ; daytime vs. night:  $N = 964$ ,  $P < 0.001$ ). Accordingly, diurnality and crepuscularity indices were higher for the mobile phase ( $I_D = +0.13$ ,  $I_C = +0.13$ ) than for the stationary phase ( $I_D = -0.04$ ,  $I_C = -0.06$ ).

For the effect of prey status on activity behaviour (Fig. 2), only “days with kill” could be compared between the two rearing periods, because too few data from “days without kill” were available for the stationary phase. On “days with kill” the activity level was about 28.6 % during the stationary phase with an almost even distribution over all light

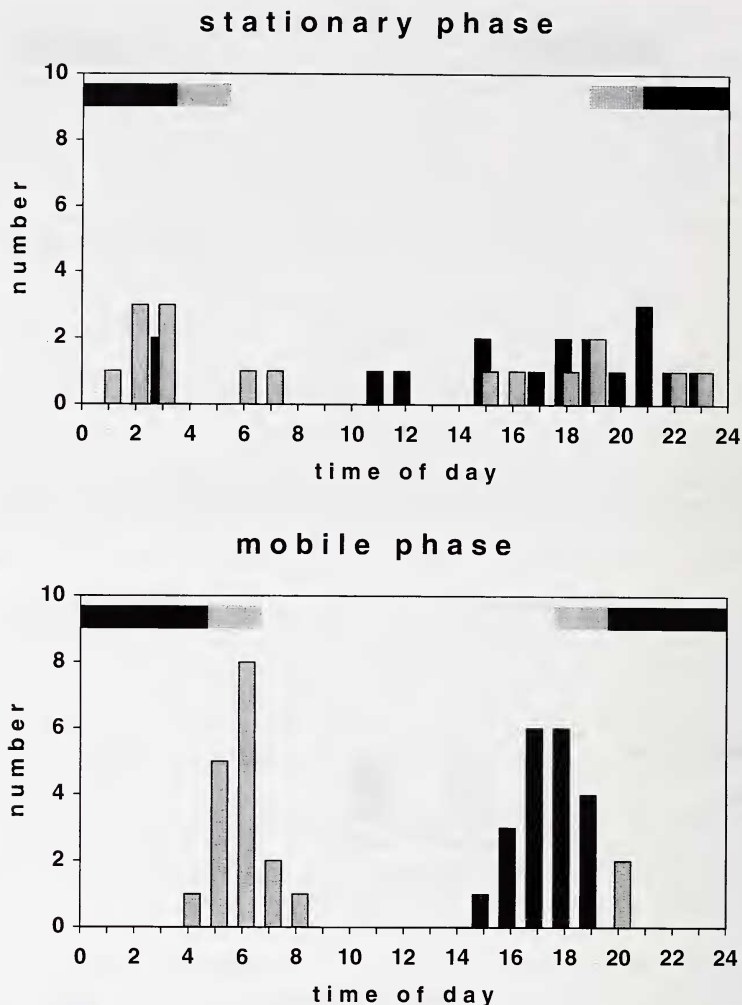


**Fig. 1.** Diel distribution of occasions when the lynx was recorded to move more than 500 m per hour. Solid line: stationary phase, broken line: mobile phase. The bars at the top indicate twilight and night-time hours.



**Fig. 2.** Mean values ( $\pm$  SE) of activity for each light phase (daytime, twilight, night-time), measured as the percentage of an hour with activity. Data are broken down to the two rearing periods and to the effect of prey status. For the stationary phase too few data were available for "days without kill" to include this category in the analysis.

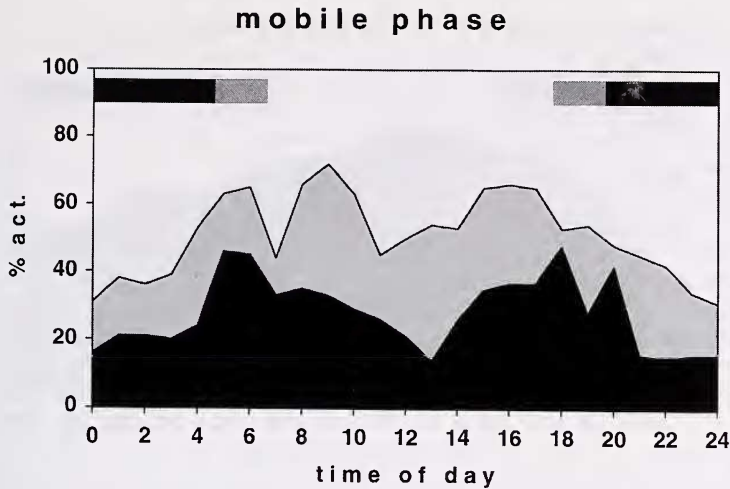
conditions ( $N = 344$ , Kruskal-Wallis,  $P = 0.188$ ;  $I_D = -0.09$  and  $I_C = +0.04$ ). The level of activity was almost the same during the mobile phase on "days with kill" (28.1 %), but now activity differed significantly among light phases ( $N = 480$ , Kruskal-Wallis,  $P < 0.001$ ), decreasing in the order twilight > day > night (daytime vs. twilight:  $N = 407$ ,  $P < 0.001$ ; night vs. daytime:  $N = 257$ ,  $p = 0.003$ ;  $I_D = +0.13$ ,  $I_C = +0.19$ ). Crepuscular activity was by then about 1.6 times higher than the 24-h average.



**Fig. 3.** Diel distribution of movements between the daytime location and the kill during the two rearing periods. Black bars: moving to the kill, shaded bars: returning from the kill. The bars at the top indicate twilight and night-time hours.

The reason for this difference in behavioural parameters became obvious when looking at the times when the lynx went to or returned from the kill (Fig. 3). As long as the kittens were stationary the female went to the kill and returned to the den at variable times. Later, when the kittens followed their mother, the pattern became much more regular, i.e., the family went to the kill in the evening and early night, and returned back to their resting place in the late night and early morning. During the mobile phase the level of female activity almost doubled on "days without kill" (51.5 %) as compared to "days with kill" (28.1 %). When she had no kill and was hunting, significantly more activity was performed during daytime and twilight than during the night (daytime vs. night:  $N = 383$ ,  $P < 0.001$ ; twilight vs. night:  $N = 265$ ,  $P < 0.001$ ; Fig. 4, c.f. Fig. 2).

To determine whether the female had preferred times for sleeping we computed the averages of the longest inactive period per hour of the day. The resultant 24-h pattern



**Fig. 4.** Pattern of female activity at "days with kill" (black) and "days without kill" (shaded) during the mobile phase. The bars at the top indicate twilight and night-time hours.

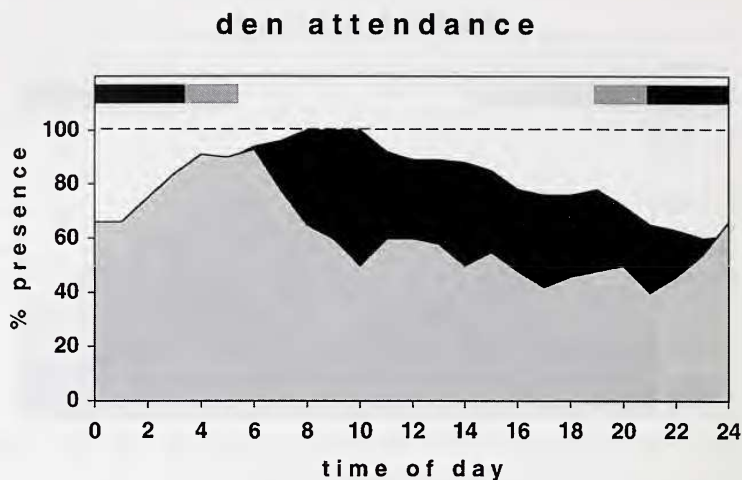
was compared with the total distribution of inactivity (60 min. – X min. active/h) for the two rearing periods as well as for days with and without kill. The distributions always corresponded well with each other ( $N = 24$ , Spearman rank correlation, all  $P < 0.001$ , stationary phase:  $r_s = 0.72$ ; mobile phase:  $r_s = 0.92$ ; "days with kill":  $r_s = 0.81$ ; "days without kill":  $r_s = 0.86$ ), indicating that sleep was an integrated part of the main rhythm of activity and inactivity, respectively.

### Den attendance

From 1 June the animal returned constantly to the same small area where she had her breeding den the previous year (HUBER, unpubl. data). After a disturbance on 23 June the female moved to a second den, approximately 400 m up the slope, where two kittens aged about 4 weeks were found on 2 July. Also later during the stationary phase the lynx family repeatedly changed location a few hundred metres, so obviously the female had access to several auxiliary dens that were used alternatively. The female always returned to the place where she started from, so she probably was not accompanied by her kittens during the excursions. On 19 July the lynxes moved 3.5 km (straight line) to a place well outside the area where the female has been hunting during the previous seven weeks.

During the stationary phase the female spent on average 17.9 h of the day (74.5 %) near her kittens at the den. The time of presence, however, differed significantly between "days with kill" (80.6 %) and "days without kill" (62.6 %), being on average 4.5 h longer on "days with kill" ( $N = 24$ , Wilcoxon,  $P < 0.001$ ). Relatively, presence at the den-site occurred more often during daytime on "days with kill" than on "days without kill" ( $N = 400$ , Mann-Whitney-U,  $P < 0.001$ , Fig. 5). However, differences in den attendance during night and twilight hours between "days with kill" and "days without kill" were not statistically significant (Mann-Whitney-U, night:  $N = 120$ ,  $P = 0.44$ ; twilight:  $N = 180$ ,  $P = 0.27$ ).

On "days with kill" the times of absence from the den corresponded generally well with the activity records ( $N = 24$ , Spearman rank correlation,  $r_s = 0.71$ ,  $P < 0.001$ ). However, activity during daytime was not closely related to the pattern of absence from the den, indicating high activity in the close vicinity of the den, probably performed as play



**Fig. 5.** Diel distribution of den attendance by the female at “days with kill” (black) and “days without kill” (shaded) during the stationary phase. The bars at the top indicate twilight and night-time hours.

and comfort behaviour. The time of absence from the den did not increase as the kittens grew older, instead it decreased slightly from 28 % to 24 % of the day ( $N = 24$ , Wilcoxon,  $P = 0.24$ ).

### Discussion

We are well aware that the data presented here are restricted to only one individual, hence the important aspect of behavioural variation among individuals had to be ignored. However, since there is only scarce information about the activity and early maternal phase of free-ranging Eurasian lynx, we feel that our approach to focus on one breeding female and to follow her closely through a whole summer may be justified.

According to the lumped data from the entire study period, activity appeared initially to be acyclic. However, a more detailed scrutiny of the data revealed a highly differentiated activity behaviour, in which prey status and rearing period had substantial effects on the pattern. In fact, our analysis verified that the flexible pattern of the females activity allowed for short-term adaptive responses to her and her kittens requirements.

The highest activity of the female was recorded during twilight and daytime, which is in accordance with a short survey of re-introduced lynxes in Austria (FESTETICS 1981). In contrast, MATJUSCHKIN (1978) observed the lynx in Russia to be mostly or predominantly nocturnal with only little diurnal activity. The general activity level of about 36 % in our study was considerably lower than the 58 % ALDAMA et al. (1991) reported for the Iberian lynx (*L. pardinus*). In particular, the lynx was less active on “days with kill” than on “days without kill”, so obviously a lynx that already has a kill can lower its hunting effort and, as a rule, does not move over greater distances.

### Behaviour during the stationary phase

The level of activity was almost the same on “days with kill” during the two rearing periods, portraying the basic activity level of a female lynx with cubs. During the stationary phase the lynx fed mostly at night, and also movements between den-site and kill occurred predominantly at night. This resulted in higher nocturnal activity on “days with kill” as compared to the mobile phase.



Time of absence from the den-site per day did not gradually increase with age of the kittens. This contradicts the assumption that the restricted hunting area during the stationary phase will demand increasing hunting efforts as kittens grow older and need more food, which in turn would lead to shorter den attendance and higher activity. So probably, the area close to the den-sites was a hunting ground sufficient to cover food demands during the entire stationary phase. This assumption is reasonable, since the large fields of dolines offer rich grazing for roe deer, while a stalking predator benefits from good cover.

This estimate of habitat quality, however, raises the question why behaviour at all changes during the transition to the mobile phase, if not for limited food supply. A suitable explanation may be a need for home range patrolling. Home range occupation was reported by SUNQUIST (1981) for a tigress while the activity of the former resident female was restricted to a small area during the early rearing period. The same resulted for lynx in Switzerland BREITENMOSE *et al.*, 1993). Hence, staying with the kittens too long may result in a loss of the home range, while starting to move with the kittens too early may endanger the kittens life. An observation made one week before the female moved with her kittens a longer distance for the first time may point to this difficult trade-off. The lynx made a remarkably extensive excursion over 15 h to the northern end of her range, and almost the same way was then taken accompanied by the kittens when they left the natal area. Thus, the mother most probably pre-explored the travelling route before.

Another reason for giving up the stationary phase may be due to energy constraints. The energy costs of lactation are high and exceed all other reproductive costs in eutherian mammals (LOUDON 1985). Deag *et al.* (1987) proved that nursing cats (*Felis domestica*) lost weight at an increasing rate over the first eight weeks after parturition. Increasing costs of lactation may, therefore, demand to provide the kittens with solid food. To our knowledge there is no report of lynx carrying large prey or parts of it back to the den, and felids are not able to regurgitate food to their offspring as known from canids. Instead, they lead their young to the kill, resulting in the vagabond behaviour of the mobile phase.

### Behaviour during the mobile phase

Activity behaviour during the mobile phase was bimodal (ASCHOFF 1957), and daytime was the preferred activity period irrespective of prey status. When the female had a kill, she went there together with her kittens in the evening, spent the whole night close to the kill, and left in the morning. Accordingly, the highest locomotor activity was recorded during twilight in this situation. This pattern may reflect a temporal adaptation to protect the kill against potential scavengers. JEDRZEWSKI *et al.* (1993) found eight species of scavengers feeding on lynx kills in Poland, with wild boar having the greatest impact. In our study area the brown bear is probably an important competitor, which is mainly nocturnal (KACZENSKY pers. comm.). It may be advantageous to stay near the kill at night to secure that the pay-back from time and energy investment is not taken away by another species. Against visually orientated diurnal scavengers like raptors blinding with leaves and branches was an efficient technique.

Even on "days with kill" activity was higher during daytime than during the night, suggesting that play and comfort behaviour mainly occurred during daytime. The activity rhythm of the kittens may thus partly explain diurnal activity of the female. Many mammalian species exhibit diurnal behaviour as juveniles and shift to nocturnality as adults, which is, for instance, known for Iberian lynx (BELTRAN and DELIBES 1994), wild boar (BRIEDERMAN 1971), and badger (EIBL-EIBELSFELDT 1954, cited in ASCHOFF 1957). If kitten activity would be a decisive factor, increased diurnality should exclusively be shown by females with young offspring.

After having consumed a kill completely, the female normally moved with her kittens during broad daylight to another area before hunting. Hunting times of the lynx were very variable during the mobile phase, but as a general rule tended to be higher during twilight and daytime. In the Swiss Jura Mountains, however, nocturnal and twilight activity prevailed distinctively (BERNHART pers. comm.). The different temporal hunting patterns in Slovenia and Switzerland may reflect adaptations to hunting on roe deer, the main prey of lynx in both areas (BREITENMOSER et al. 1993; HUBER unpubl. data) in differently structured habitats. In Slovenia, forest covers more than 90 % of the study area, so that deer can stay under cover for long periods of time. In this situation temporally flexible roaming may give the best hunting success. In the Swiss study area, however, forest cover is only about 39 % (BERNHART pers. comm.) and roe deer emerge predominantly in the evening to browse on pastures. Accordingly, lynx hunt especially along the forest edges during the evening and night (BREITENMOSER and HALLER 1987) with frequent indications of ambushing (KACZENSKY pers. comm.). Since founders of both populations stem from the same population of origin in Slovakia (HALLER and BREITENMOSER 1986; COP and FRKOVIC 1998), behavioural differences between Swiss and Slovenian lynx are likely to reflect responses to the two areas rather than individual or genetic variance. This indicates that behavioural flexibility of Eurasian lynx allows to adapt foraging to different ecological situations.

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### Zusammenfassung

#### *Aktivität eines Luchsweibchens (Lynx lynx) während der Jungenaufzucht in Slowenien*

Aktivitätsverhalten und Zeitbudget eines Luchsweibchens (*Lynx lynx* L.) in Slowenien wurden während der ersten fünf Monate der Jungenaufzucht von Juni–Oktober 1995 mittels Radiotelemetrie untersucht. Die Aktivität wurde teils kontinuierlich mit einer automatischen Registrierstation, teils diskontinuierlich durch "time-sampling" aufgenommen. Insgesamt wurden 1818 Datenstunden hinsichtlich des Alters der Jungen analysiert, wobei zwischen Tagen mit und ohne Riß unterschieden wurde. Im Durchschnitt war die Luchsin pro 24 Std.-Tag für 8,5 Std. aktiv, wobei die meiste Aktivität in der Dämmerung und tagsüber erfolgte. An Tagen ohne Riß war sie stärker diurnal und insgesamt deutlich aktiver als an Tagen mit Riß. Verglichen zur frühen, stationären Phase der Jungenaufzucht, in der die Luchsin die Jagdausflüge auf einen kleinen Teil ihres Streifgebietes beschränkte, war sowohl die Gesamtaktivität als auch die Dämmerungs- und Tagaktivität in der späteren, mobilen Phase höher. Ortswechsel zwischen Riß und Tagesstandort erfolgten in der stationären Phase unregelmäßig über die Nacht verteilt, während Ortswechsel in der mobilen Phase sehr regelmäßig in der Morgen- bzw. Abenddämmerung stattfanden. An Tagen mit Riß verbrachte die Luchsin durchschnittlich 81 % des Tages bei ihren Jungen, jedoch nur 63 % an Tagen ohne Riß. Die Zeit der Abwesenheit von der Wurfhöhle nahm während der stationären Phase nicht mit dem Alter der Jungen zu. Die Verhaltensänderungen während der Jungenaufzucht können vor dem Hintergrund gegensätzlicher Erfordernisse (Jagd, Rißverteidigung gegen Konkurrenten, Schutz der Jungen, Streifgebietskontrolle) interpretiert werden. Ein Vergleich der Ergebnisse mit Studien aus Gebieten unterschiedlicher Habitatstruktur läßt darauf schließen, daß das flexible Jagd- und Aktivitätsverhalten des europäischen Luchses eine Anpassung an verschiedenartige ökologische Bedingungen erlaubt.

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